ARM Nauru Research Station
Site Visit 0307ND Report

Visit Duration: 03 July to 11 July 2003

Denig District, Republic of Nauru
and
Darwin, Australia

CONTENTS

A. Introduction

The main goals of the TWP Operations Site Visit 0307-ND Visit to ARCS-2 at Nauru and to ACRS-3 at Darwin were the following: 1) Dismantle NIES Site 2) Document Site 3) H2 Generator Maintenance.

This report is organized according to the planned tasks or work units performed during the Site Visit. Within these work units the activities accomplished are arranged chronologically. Most of the information was put together by the Site Visit Team members based on the actual visit, daily reports.

B. TWP Operations Management and Site Visits

Site Visits are scheduled on approximately four-month intervals and are focused mainly on routine maintenance, instrument calibration, instrument replacement, and training. Sometimes non-routine visits are needed for technical tasks such as emergency repairs, retrofits, and/or the addition of new instruments. A formal audit-out is performed before departure.

The work on the Site Visit is performed by the Site Visit team, but often in close coordination with the local on-site Observers. The team holds a daily, morning tasking meeting at the site using the proposed Site Visit tasking schedule. After each day's work, the team meets to summarize work activities and an assigned team member writes a "Daily Report" and e-mails the report to TWP personnel in the U.S. Because of time-zone differences, necessary calls to instrument mentors in the U.S. are done in the morning.

Site Visit Members

- Rex Pearson
- Mark Gleadhill
- Albert Mendoza

C. Tasks Performed - Nauru

1. Generator – repair transfer switch (Pearson/Aremwa)
   04 July:

   At the request of Monty Apple the transfer switch was changed out and tested.

   The data system was taken down at 0115z 3July03 and restored at 0300z 4July03.

   The fault in the old transfer switch was due to a "cooked" solinoid that operates the standby section. The top plastic section of the solinoid has melted due to overheating (most likely due to a shorted turn) and thus preventing the plunger from pulling in.

   05 July:

   Power failed overnight and the Genset supplied power as anticipated.

2. Generator – train Observers on transfer switch in "manual" setting (Pearson)
   04 July:

   Observers were attempting to operate the switch correctly, but were unable due to the melted plastic in the solinoid. I am confident they are fully capable of operating it in the future. The Nauru electrician (Abraham Aremwa) from NPC was very competent in performing the work and should be considered for future site work as/when the need arises.

3. Generator – service (Gleadhill)
   07 July:

   Generator service commenced.

   Water pump will need replacing on next service – showing signs of leaking – no spare gaskets on site – Mark will order.

   08 July:

   Genset service completed, Mark will send report.

   Mark is going to try to get the required gaskets on the Thursday flight – he showed us what is required for the changing of the water pump if the parts arrive in time.

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4. AERI - restart due to power outage (Pearson)
   03 July:

   Aeri hard drive repaired and is now booting correctly – Aeri program is displaying.

   Unable to get the network started – have send Conner an e-mail re this.

IP Config checked, unable to ping 127.0.0.1 or the physical address 198.129.81.39. IP service restarted with out success – suspect either a Config problem or faulty network card

04 July:

Continued checking network fault. Advised Conner of progress, it appears the network card is faulty. There is a similar card in the MMCR OS2 computer but of a different manufacturer. Conner was given the details and he is trying to determine if we can load suitable drivers for the card.

05 July:

Spoke to Conner re the Aeri – we do not have a resolution yet

I have found some drivers for the SMC card but need to confirm how to install them. As the OS2 operating system is not used by many people, there is some uncertainty as to how to complete the installation. We are web searching to try to find information or a procedure.

06 July:

Continued with the Aeri problem. Tried to install the drivers but the floppy disk drive failed. Have taken the one from the Aeri MADS computer and installed into the Aeri and am now able to read the disk.
Thanks to Conner and Kevin I am now able to get the OS2 editor working so am (finally) in a position to try to change the Config for the replacement Ethernet card.

07 July:

No further development

08 July:

Ethernet card is now working – required "manual" intervention to get it started.

Network to the D Van was not functioning – the fibre/Ethernet converter in the SDS rack was not functioning, rebooted the unit and tested ok.

Checked data from the Aeri is now appearing in the collection system.

09 July:

Ralph Dedecker advised the GPS on the Aeri was not functioning correctly.

Checked and relocated the antenna – is now receiving 7-8 satellites regularly throughout the day

11 July:

Aeri display stopped showing current data.

Contacted Ray this morning (4am Nauru time) and it was determined that the unit was collecting data but a process had stopped – probably due to some bad data.

The July 10 data files were renamed to make the software think it was starting the day again, Aeri rebooted and it started to function correctly (Phew)

5. AERI AC Unit – oversee the replacement of broken AC Unit (Pearson)
   05 July:

   08 July:
   Chased up A/C mechanic – hopefully will be here tomorrow

   10 July:
   A/C mechanic has not turned up at site and is unavailable in the next few days

6. MPL- fine tune and perform maintenance on instrument (Mendoza)
   07 July:
   Upon arrival I found the MPL in two states. Detector was out of alignment and the telescope was not collimated. The collimation was adjusted and confirmed by Connor to be right on. The detector alignment was adjusted with the signal level improving 3 fold. The system is now in a state that is detecting cirrus much better than before.

   08 July:
   Continued maintenance on MPL.

   09 July:
   Continued maintenance on MPL.

   10 July:
   Continued maintenance on MPL.

7. MPL – check shutter operation (Mendoza)
   11 July:
   Completed

8. DS – test the APC soft shutdown software? (Pearson)
   10 July:
   Software not ready to install

9. Check D Van Clary UPS
   04 July:
   During the shutdown of the SDS for the power supply repairs it was noticed the Clary UPS only held up for a short time (4 minutes). This will be checked tomorrow when the SDS APC UPS has fully re-charged its batteries.

05 July:

Removed power from Clary UPS several times without any problems.

On the last run the UPS was run for 30 minutes without mains power, the battery voltage dropped to 96.2 volts and the UPS functioned normally.

06 July:

Several more tests on the Clary (without problems) were done today
I am starting to suspect this problem may have been related to the unit not being fully charged when we took the site down. I disconnected the batteries and did a load test on each cell and they showed no signs of high resistance so do not suspect a battery problem.

10. Install Radmin service on AWS Met console computer

03 July:

Radmin installed and tested for remote maintenance of AWS software

11. CIMEL – troubleshoot and repair (Pearson)

03 July:

Cimel checked and power supply voltages etc all appear normal.

Time/date was incorrect – this may imply the unit has lost power.

Solar panel was removed to check if unit stayed working and that the battery voltage did not drop straight away – tested ok.

Internal battery 5.27 volts.

Time and date reset at 0255z – Scott Smith advised – will continue to monitor.

04 July:

Cimel time/date held up overnight – still need to have data transfer confirmed

05 July:

Cimel time/date still ok

08 July:

Scott Smith advised data is now appearing in the system. He requested we check the times – this was done the Goes was out by 20 seconds.

12. Check Smet anemometers

Working with Jim Mather to try to determine what is happening with the wind speed sensors and which one is the correct reading.

Have sent data comparing the AWS readings to the ARM readings.

13. Restore MMCR network interface

10 July:

Restored the Ethernet card to the MMCR OS2 computer and bought the OS2 and Solaris computers back on line. Tested access remotely and functioning.

14. VoIP testing with Dick Eagan/Ron Reed

10 July:

Tests on VoIP telephone circuit from ANL/SGP to Nauru.

Nauru is able to receive calls but unable to place an outbound call.

Dick is investigating.

15. R1 loosing power and shutting down

11 July:

R1 computer has lost power indication several times in the last day – requiring manual intervention to restart. This required the power cord to be removed and re-plugged into R1 before it would restart.

Discussed with Ron Reed and it could be either a faulty power supply or a fault in R1 computer.

I substituted an IBM laptop power supply for the R1 power supply to see if that solves the problem. If not I will send the Darwin R1 to Nauru on Monday – the observers have been shown how to swap the hard drives over and this will replace the R1 hardware. The faulty unit (if that is the case) will be shipped to SGP and Ron will send the SGP spare to Darwin.

The hard drive from the Darwin unit will be kept in Darwin if the computer is shipped.

D. Tasks Completed – Darwin

1. MPL- replace laser diode (Mendoza)

14 July:

Albert replaced the MPL laser diode

Upon arrival I found the MPL in two states. The laser diode power supply failed and the detector was out of alignment. The power supply was replaced. The laser is now at normal output levels. I'm currently working on the alignment. Progress has been made.

15 July:

Albert reports that detector started buzzing and died about 9:30 PM local time (memorial services are still in the planning stage).

16 July:

Rex working with Kim Nitschke to get detector from Nauru. Plans have been finalized and detector should arrive in Darwin Saturday afternoon. Rex and Albert worked very hard on this today. Albert is working on rough alignment of the optics.

17 July:

Albert continues to work on improvement of the optical alignment.

18 July:

Albert continues to work on improvement of the optical alignment. He also changed hotels.

19 July:

New detector arrived this morning and Rex brought it in. Albert arrived about 45 min. later and was very happy.

20-22 July:

Detector installed and Albert working on improving signal.

23 July:

Decision made to send MPL back to NASA for upgrading.

24 July:

Albert left today. The MPL could not be improved by alignment to be able to see cirrus clouds during the day.

"I talked to Chuck (and also got a look some of the data for today).We'd like to have that MPL packed up and sent home. I haven't got any word from either Judd or Jim Spinhirne today regarding a repair timeframe but I don't really think we have much choice. The signal to noise on that system is only barely high enough to detect cirrus at night. During daytime it would be swamped. - Connor"